BULLETIN
of the
Chicago Herpetological Society

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N° 11.
PLATE LII.
Chuck-wills Widow.
CAPRIMULGUS CAROLINENSIS. Bris.
Male 1. Female 2.
Harlequin Snake
Drawn from Nature, and Published by John J. Audubon, F.R.S.E. L.S.
Engraved, Printed, & Coloured, by R. Havell.

BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY
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Audubon's Herps

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For the past several years, Chicago Herpetological Society member Roger Carter has shared in the *Bulletin* and online his photographs of depictions of reptiles and amphibians he has seen in zoos and similar places throughout the country. For an even longer time, *Bulletin* editor Mike Dloogatch has used illustrations from significant herpetological literature to illustrate the *Bulletin*'s covers. Inspired by Mike and Roger, I have shared online my photographs of sea turtle and alligator sculptures I have seen in Collier County, Florida. I do not regard such depictions as novelties; rather, they indicate how the culture perceives these animals.

During this time I have presented a series of programs about birds on behalf of the DuPage Birding Club to many libraries, park districts, clubs, and museums in Illinois and Florida. One such program deals with birds in paintings from the ancient Egyptians to the present. While working on that program, I concluded that such depictions fall into one of three broad categories. First, the bird is a prop in the painting, i.e., the bird may add little or nothing to the painting. Many 19th-century landscape paintings such as Asher Brown Durand's "Kindred Spirits" depicting Thomas Cole (considered the founder of the Hudson River School of American landscape painters) and his friend, the American poet William Cullen Bryant, on a ledge overlooking a waterfall, include generalized images of birds in the distance.

Second, the bird may be a symbol: This is true whether the bird image is found on the wall of an Egyptian tomb (such images, while abstract, show a specific species, e.g., Sacred Ibis), in a medieval religious text (quite often these are doves, symbols of the Holy Spirit), or in 17th-, 18th-, and 19th-century still lifes (where dead game birds signify the wealth of whomever commissioned the painting).

Finally, the bird may be the subject of the painting. Such images are rare before the mid-18th century, but become increasingly common during the 19th century. In these paintings, the artist attempts to depict the bird in lifelike detail, often in a setting that suggests not just the bird's appearance, but its habitat and habits. These paintings, which often served as the basis for elaborate and costly volumes of etchings, resulted from the exploration of Asia, Africa, Australia and the Americas, and the interest these exotic locations had to both Europeans and Americans. It is worth noting that at this time, many wealthy people assembled what amounted to personal museums of plants and animals. Many contemporary explorer/naturalists financed their expeditions by supplying specimens to their private sponsors or selling specimens to collectors.

Perhaps the best-known painter/naturalist of the 19th century to Americans is John James Audubon, whose name was adopted by one of the most important conservation organizations in the country, although recent scholarship suggests that Audubon, because of his methods and views, may be an unfortunate eponym. Regardless, Audubon's work, *The Birds of America*, established the norms by which the works of others were and are judged: The bird is the subject of the depiction, the bird is depicted in lifelike and life-sized detail, the bird is engaged in some typical behavior, and the bird is placed in its habitat. During this time, the public's awareness and appreciation of nature grew, so that *wilderness* lost its negative connotation and the land, water, wildlife, etc., were seen as things of value in their own right and not just resources to be exploited.

With all this in mind, I re-examined Audubon's paintings, hoping to discover what, if any, reptiles or amphibians he depicted and how he depicted them. I was not surprised that I could not and have not found anything by Audubon in which a herptile is the subject of the painting, but I was able to locate several bird paintings in which a herptile plays a role.

A prime example is the painting of four Northern Mockingbirds defending a nest from a Timber Rattlesnake (Figure 1). Plants and animals from the New World enthralled Europeans, Audubon's initial audience, and rattlesnakes especially, fascinated them. Typical of Audubon's work, several birds are shown in various postures that display the species' plumage. The snake is shown in equal detail, but its gaping mouth suggests an aggressive ferocity that reinforces stereotypes and prejudices about snakes, rattlesnakes in particular. In his quest to portray the birds as accurately as possible, Audubon depicted all the birds life-size (a single page in *Birds* measures 39" by 26"), which

Figure 1.

Figure 2.

explains some of the awkward postures (see Figure 5). For reference, mockingbirds are about a foot long.

I question several things about the painting. First, mockingbirds are very protective of their nests and territories and usually drive away other mockingbirds. Having two pairs defend a nest would be highly unusual—in fact, improbable. Second, while mockingbirds sometimes nest as low as three feet from the ground, they typically nest much higher, sometimes as high as 60 feet. That raised the third question in my mind: How arboreal are rattlesnakes? Peterson (1981) notes Audubon "was much criticized for this dramatic painting because it was claimed rattlesnakes do not climb trees." Rattlesnakes, I learned, do climb into shrubs, although such behavior is unusual. But would a rattlesnake, a sit-and-wait predator, pursue a bird or its eggs (the eggs are barely visible in the painting; with his eye for detail, Audubon accurately portrayed the markings on a Northern Mockingbird's eggs)? Birds do enter the Timber Rattlesnake's diet, but whether or not eggs do is debatable. Perhaps if the egg were warm enough and if it smelled like a brooding parent, a rattlesnake might consume it.

I concluded that despite its detailed depiction, the rattlesnake in the painting was essentially a prop intended to create drama. Because Audubon was part of the Romantic movement in the arts and literature, such drama was important to the audience buying his books.

Think of the settings in Edgar Allen Poe's stories, e.g., "The Fall of the House of Usher."

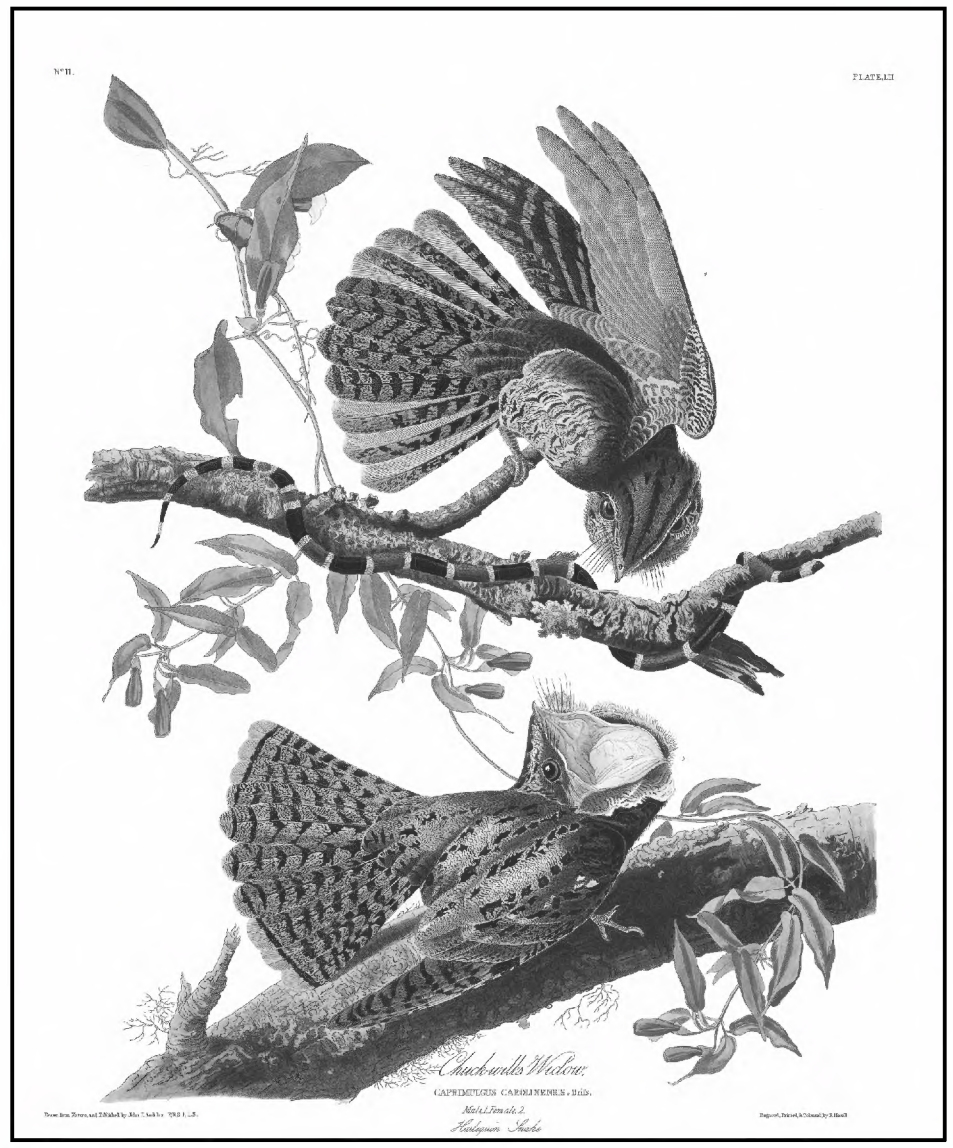

Figure 3.

Another painting by Audubon (Figure 2) repeats elements from the mockingbird painting. Again, two pairs of birds, Brown Thrashers, defend a nest with eggs from a snake, in this case what appears to be a Black Racer or Black Rat Snake. Again, Audubon's depiction of the birds illustrates their plumage; again, I had the same misgivings about these birds that I had in the mockingbird painting. Peterson (1981) comments "it is doubtful whether a second pair of thrashers would come to the aid of their distressed neighbors." However, rat snakes are arboreal, and birds and their eggs do form an important component of their diet.

A third painting, this one of Chuck-will's-widow (Figure 3), echoes one element of the other two: The birds are shown in such a way to reveal their plumage. The coral snake's colors and pattern are also accurately depicted. But the depiction of the snake's behavior puzzles me. Coral snakes are fossorial, which means they burrow—would one be in a shrub or tree? Audubon, Peterson (1981) writes, "apparently witnessed this little scene on one occasion in the early twilight. He believed the little brightly colored snake . . . to be quite harmless." Baby coral snakes do eat small bird's eggs, but I could find nothing suggesting adults consume eggs; besides, Chuck-will's-widow, an insectivore, is not a small bird. As far as the bird's diet is concerned, I could find no record of their eating snakes. So again: Audubon includes the snake in the picture for drama—and probably exoticism, too, given the coral snake's colors.

In his rendering of a Swallowtail Kite (Figure 4), Audubon turns the tables: Here it is the bird eating the snake. In fact, although insects make up the majority of the kite's diet, snakes constitute a component. As such, this painting is typical of many Audubon paintings showing birds stalking and consuming prey. I consider the snake nondescript, a prop meant to inform the

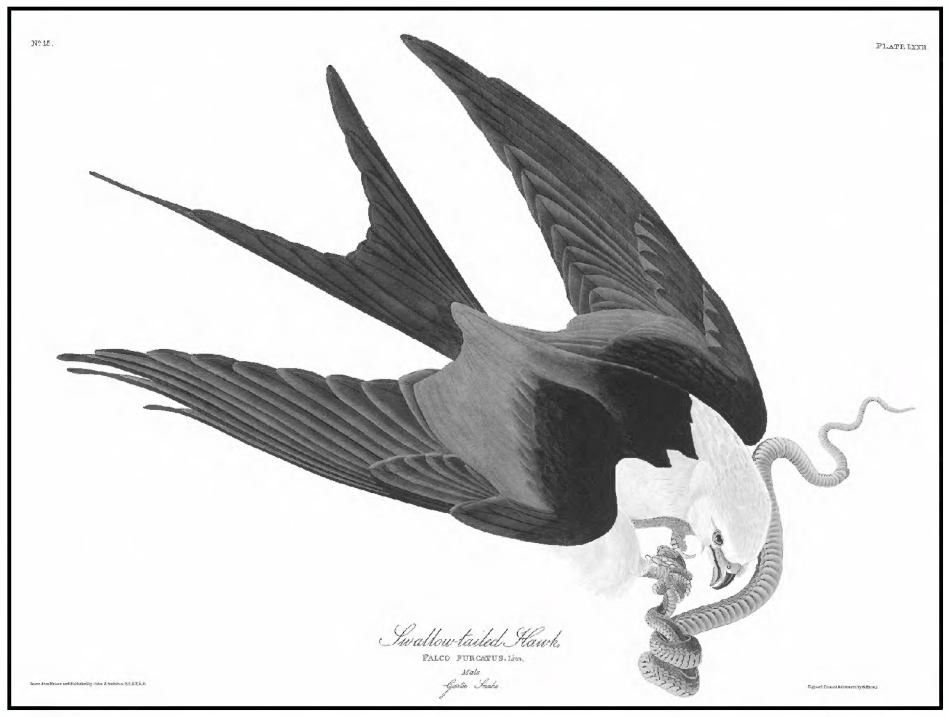

Figure 4.

reader something of the bird's natural history, but Peterson (1981) identifies it as garter snake.

In keeping with the bird-as-predator theme, Audubon's painting of a Great Egret stalking what might be a horned lizard (Figure 5) puzzled me: While I have little experience with horned lizards, I have watched Great Egrets all over the eastern United States. Without exception, I have seen them at the edges of ponds, lakes, streams, and rivers; I have never seen one more than a few feet from water. On the other hand, I knew horned lizards only inhabit arid and semi-arid habitats. Is it remotely possible the paths of the bird and lizard would cross? I have seen herons and egrets stalk and consume lizards, though. Several years ago I watched an immature Little Blue Heron—the immatures of this species are white—catch and eat a Brown Anole outside our condo in Florida; later I saw the same bird pair up with a Cattle Egret, a decidedly land-based species,

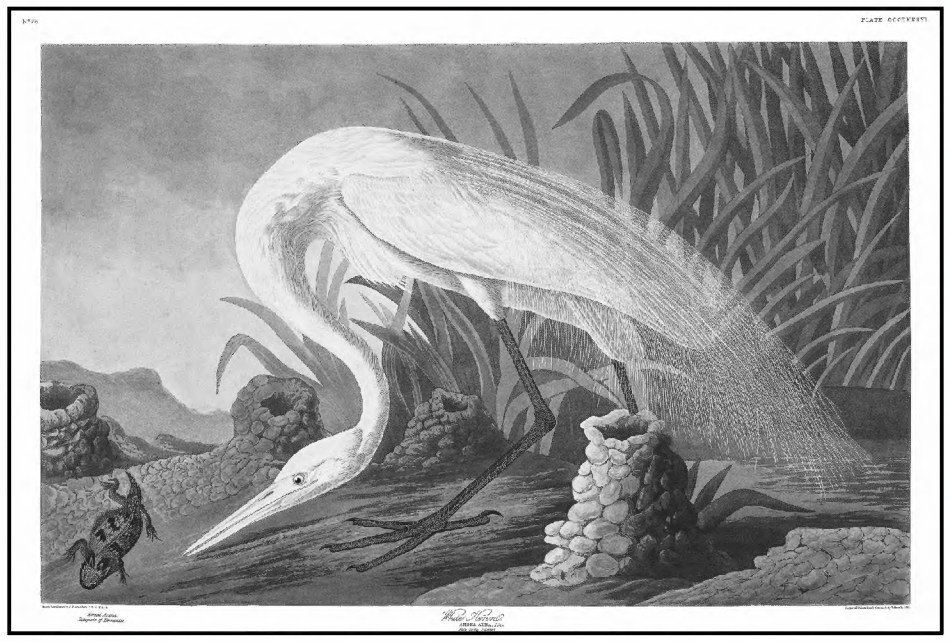

Figure 5.

stalking lizards in a hedge. The setting in Audubon's painting is clearly a marsh, complete with reeds and crayfish chimneys. A note from Peterson (1981) reminded me that often Audubon himself did not depict a detailed setting for a bird; many times it was the engraver. In this case, "Havell, the engraver, added a horned lizard, an inappropriate reptile of arid regions farther west." Puzzle solved.

A more plausible depiction portrays a Whooping Crane, one of North America's largest and now rarest birds, stalking a small American Alligator while a second alligator appears to lie dead at the bird's feet (Figure 6). Both Whooping Cranes and their relatives, the fairly common Sandhill Crane, can be found in marshes and adjacent fields, and both species pretty much eat whatever they can catch, although they are omnivores and also consume waste grain and berries. Amphibians and reptiles figure into their diet, and even if Audubon had not witnessed such behavior, it is possible he heard stories. On the other hand, there are records of alligators eating Whooping and Sandhill Cranes, although it is unclear whether the alligators caught and killed the birds or if they were simply scavenging. Regardless, Audubon's sympathies do not seem to be with the alligators!

One of the birds I frequently see in alligator habitat in Florida is the Red-shouldered Hawk, and I was able to find three Audubon paintings of this bird in *Birds of America*. One depicts a pair perched in a tree, and the second a pair tussling in midair; but the third (Figure 7) shows a hawk catching what may be a bullfrog. These woodland birds are fairly common in one of the swampy preserves I visit in Collier County, Florida; in fact, this

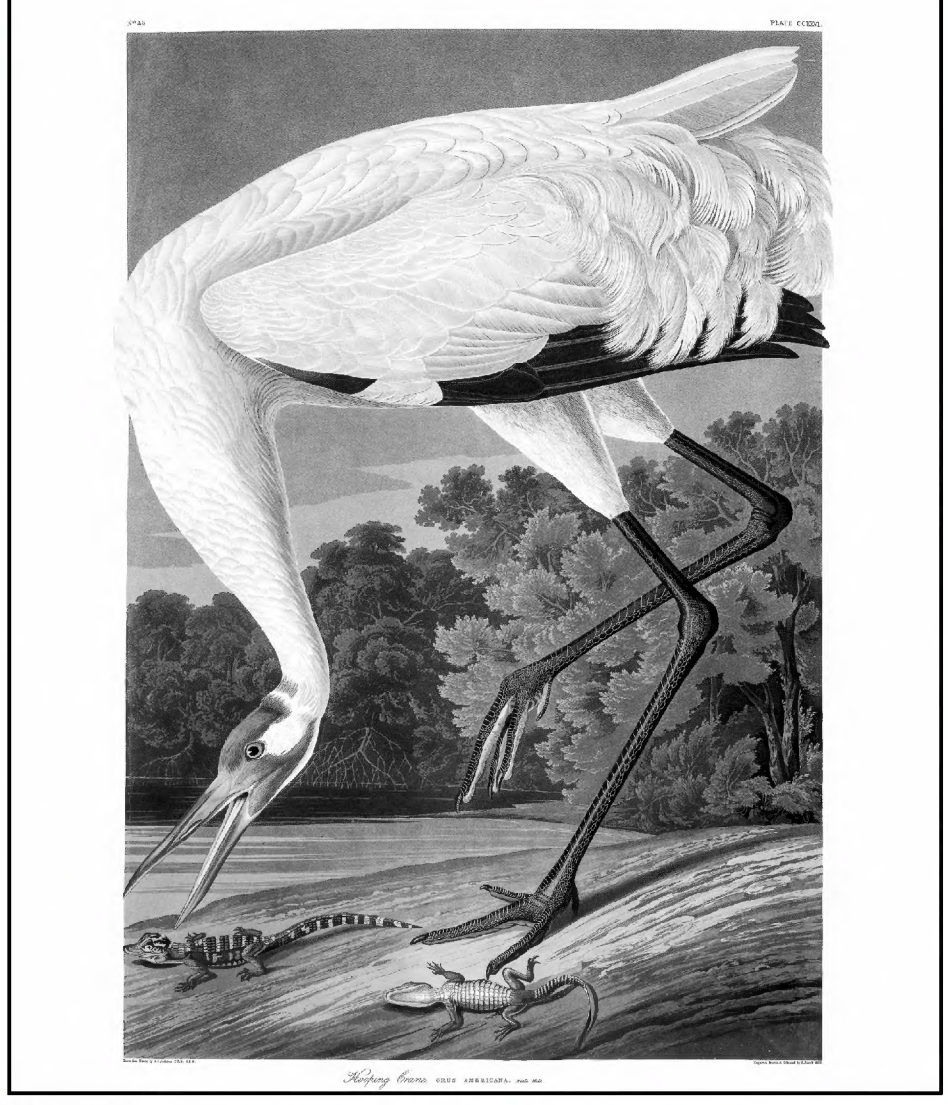

Figure 6.

Figure 7.

Figure 8.

November I spotted an occupied nest built over a pond that has housed a mother alligator and her young since at least last March (I saw the alligator and two or three of her young the day I located the nest). Red-shouldered Hawks prey heavily on snakes, particularly rat snakes, and when I went bird-hunting for Audubon's print of this species, I expected to see a snake clutched in the talons of one, so the frog was a surprise! The depiction of the frog, while not as realistic as the hawk's, is almost sympathetic: To me it seems to have a nearly human expression, and the blood spilling from where the hawk's talons pierced the frog evokes a degree of compassion. The painting captures the emotional pathos associated with Romantic art.

The final image depicting a herptile that I found in *Birds of America* is Audubon's portrayal of an adult and juvenile Black-crowned Night Heron (Figure 8), a bird perhaps familiar to CHS members who frequent Lincoln Park Zoo, where for several years there has been a nesting colony. The adult is grabbing a frog, probably a Leopard Frog, which is entirely in accordance with what is known about this wetland bird's diet.

While reptiles and amphibians do not figure predominantly in *Birds of America*, their few, scattered depictions suggests Audubon was not totally ignorant of these animals and their relationships with the birds sharing their habitats (crane and horned lizard aside). In the case of birds and snakes, Audubon's sympathies are clearly with the birds. The cold-blooded animals serve as props, but not meaningless ones: Their inclusion illustrates predator-prey relationships, as well as providing visual drama. As such, they are an element that contributed to the 19th century's growing awareness and appreciation of the natural world.

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Notes on Reproduction of Brimley's Chorus Frogs, *Pseudacris brimleyi* (Anura: Hylidae), from Virginia

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Abstract

I conducted a histological examination of gonadal material from 20 adult *Pseudacris brimleyi* from Virginia consisting of 13 males and seven females. The smallest mature males (sperm in lumina of seminiferous tubules) measured 25 mm SVL. The smallest mature females (in spawning condition) measured 27 mm SVL. Two of the seven *P. brimleyi* females (29%) contained atretic follicles. The *P. brimleyi* reproductive cycle in Virginia commences in February (presence of spermiogenic males) and based on previous reports in the literature, continues into spring (Table 2).

Pseudacris brimleyi Brandt and Walker, 1933, occurs from eastern Virginia south to eastern Georgia along the Atlantic Coastal Plain (Dodd, 2023). It is a secretive and seldom seen species (Beane et al., 2010). *Pseudacris brimleyi* do most of their calling from December to March (Elliott et al., 2009). After breeding in temporary pools, ditches and wooded wetlands, they disperse to surrounding fields and woodlands (Jensen et al., 2008). Mitchell (1986) reported that in Virginia, *P. brimleyi* deposited eggs during March–April. The breeding season of *P. brimleyi* is given as February to April (Ethier et al., 2021). In this paper I present data from a histological examination of *P. brimleyi* gonads from Virginia. Utilization of museum collections for obtaining reproductive data avoids removing additional animals from the wild.

A sample of 20 *P. brimleyi* from Virginia (Appendix) collected 1940 to 1987, consisting of 13 adult males (mean snout–

Table 1. Two stages in the ovarian cycle of 7 adult female *Pseudacris brimleyi* from Virginia.

Month	*n*	Ripening (= vitellogenic)	Spawning condition
March	2	1	1
November	4	0	4
December	1	0	1

vent length, SVL = 27.1 mm ± 1.4 SD, range = 25–29 mm) and 7 adult females (mean SVL = 29.4 mm ± 1.9 SD, range = 27–31 mm), was examined from the herpetology collection of the Carnegie Museum of Natural History (CM), Pittsburgh, Pennsylvania, USA.

A small incision was made in the lower part of the abdomen and the left testis was removed from males and a piece of the left ovary from females. Gonads were embedded in paraffin, histological sections were cut at 5 μm and stained with Harris hematoxylin followed by eosin counterstain (Presnell and Schreibman, 1997). Histology slides were deposited at CM. An unpaired *t*–test was used to test for differences between male and female SVLs.

Testes of *P. brimleyi* are surrounded by black pigment, as previously reported by Rugh (1941) and Oplinger (1966) for *Pseudacris* (as *Hyla*) *crucifer.* Otherwise, the testicular morphology of *P. brimleyi* is similar to that of other anurans, as described in Ogielska and Bartmańska (2009a). Within the seminiferous tubules, spermiogenesis occurs in cysts which are closed until the late spermatid stage is reached; cysts then open and differentiating sperm reach the lumina of the seminiferous tubules (Ogielska and Bartmańska, 2009a). A tangled mass of spermatozoa or open sperm cysts was observed in the lumen of each seminiferous tubule. A ring of germinal cysts is located on the inner periphery of each seminiferous tubule. There was no discernible testicular cycle in my monthly samples of *P. brimleyi* males (N = 13), as all exhibited spermiogenesis (sperm formation): February (*n* = 4), March (*n* = 8), November (*n* = 1). The smallest sexually mature *P. brimleyi* males both measured 25 mm SVL: CM 126065 from February and CM 113591 from March. Wright and Wright (1949) reported adult males of *P. brimleyi* ranged between 24 and 28 mm SVL in body size.

The mean SVL of *P. brimleyi* females was significantly larger than that of males ($t = 3.2$, df = 18, $P = 0.0051$). The ovaries of *P. brimleyi* are similar to those of other anurans in being paired organs lying on the ventral sides of the kidneys; in adults the ovaries are filled with diplotene oocytes in various stages of development (Ogielska and Bartmańska, 2009b). Mature oocytes are filled with yolk droplets; the layer of surrounding follicular cells is thinly stretched. Two stages were present in the spawning cycle (Table 1): (1) "Ripening (= vitellogenic)," in which ripening oocytes (accumulating yolk) predominated as reported in Uribe Aranzábal (2011); (2) "Spawning condition," in which mature oocytes predominated. My small female sample (*n* = 7) contained females from March, November and December (Table 1). The two smallest mature females (CM 127384 and CM 23133) of *P. brimleyi* (ready to spawn) both measured 27 mm SVL and were from March. Wright and Wright (1949) reported adult females of *P. brimleyi* ranged between 27 and 32.5 mm in body size.

Two of seven *P. brimleyi* females (29%) contained atretic follicles. Atresia is a widespread process occurring in the ovaries of all vertebrates (Uribe Aranzábal, 2009), and is the spontaneous digestion of a diplotene oocyte by its own hypertrophied and phagocytic granulosa cells, which invade the follicle and eventually degenerate after accumulating dark pigment (Ogielska and Bartmańska, 2009b). See Saidapur and Nadkarni (1973) and Ogielska et al. (2010) for detailed descriptions of follicular atresia in the frog ovary. Atresia plays an important role in fecundity by influencing numbers of ovulated oocytes (Uribe Aranzábal, 2011).

No postovulatory follicles (evidence of recent spawning) were found (*sensu* Redshaw, 1972). This is likely due to my small female sample size (*n* = 7). They have been reported in other species of *Pseudacris*; see Goldberg (2023).

In conclusion, the *P. brimleyi* reproductive cycle in Virginia commences in February (spermiogenic males present) and based on previous reports in the literature continues into spring (Table 2 and Ethier et al., 2021). It therefore seems likely the *P. brimleyi* gravid females from November and December would have retained their eggs until spring, in keeping with Jørgensen et al. (1979) who reported ovaries are close to breeding size by the time of hibernation in frogs from the temperate zone.

Acknowledgments

I thank Jennifer Sheridan (CM) for permission to examine *P. brimleyi* and Mariana Marques (CM) for facilitating the loan: 2023–01.

Table 2. Months of breeding by state for *Pseudacris brimleyi.*

Location	Breeding Period	Source
Carolinas and Virginia	winter and early spring	Beane et al., 2010
Georgia	late winter to early spring	Jensen et al., 2008
North Carolina	February to April	Brandt and Walker, 1933
North Carolina	call December to April	Dorcas et al., 2007
Southeast	late winter through early spring	Dorcas and Gibbons, 2008

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Appendix

Twenty *P. brimleyi* from Virginia examined from the herpetology collection of the Carnegie Museum (CM), Pittsburgh, Pennsylvania, USA. **Chesapeake City (no county)** CM13250, 113591, 113592, 113598, 113637, 129492, 129495, 129497–129499; **New Kent County:** CM 18646, **Suffolk County:** CM 126061, 126064–126066, 127268, 127317, 127384; **Virginia Beach County** CM 23132, 23133.

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A Historical Report of Death by an Eastern Massasauga, *Sistrurus catenatus* (Rafinesque, 1818), in Piatt County, Illinois, USA

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The Eastern Massasauga (*Sistrurus catenatus*), colloquially known as the prairie or swamp rattlesnake, is a small viperid (Ernst and Ernst, 2003) native to parts of Missouri, Iowa, Illinois, Wisconsin, Indiana, Michigan, Ohio, Pennsylvania, and New York, USA, and Ontario, Canada (Powell et al., 2016). The species inhabits low, wet areas such as marshes and wet prairies, as well as adjacent upland prairies, savannas, and woodlands. Eastern Massasauga populations have suffered immensely at the hands of man, and today only a single extant locality is known from Illinois although historically the species was distributed throughout much of the northern two-thirds of the state (Phillips et al., 2022). Despite significant population declines, it was not until 2016 that the species received federal protection through the Endangered Species Act (USFWS, 2016).

Figure 1. Eugene Denman's headstone. The name is misspelled ("Eugeen"). Despite recent restoration, the stone is in poor condition. Photograph by Joseph T. Cavataio.

Eastern Massasaugas pose little threat to humans due to their generally inoffensive behavior, low population numbers, and isolation from dense human populations. Bites are rare, and no fatalities have been reported since 1935, primarily due to advances in snakebite treatment (Wasko et al., 2021). However, human–Eastern Massasauga interactions were frequently documented during the nineteenth and early twentieth centuries, beginning during early colonization by European settlers and peaking in the 1880s.

Wasko et al. (2021) found that since 1800, 70 alleged cases of snakebite by Eastern Massasauga were reported in Illinois, 25 of which resulted in death (36% fatality rate). Interestingly, while Illinois did not report the most snakebites, its fatality rate was nearly triple that in Indiana, Michigan, and Ohio (Wasko et al., 2021).

One such historic fatality was that of Eugene Denman of Cerro Gordo, Piatt County, Illinois. On 27 June 1856, Denman was two years, five months, and 12 days old when he was fatally envenomated by a rattlesnake (Piatt, 1883). Following his death, he was interred at Peck Cemetery in neighboring Macon County (Figure 1).

Artist's rendition of pre-settlement Piatt County in 1853, much of it having been wet prairie (Bemont Centennial Corporation, 1955).

While Piatt (1883) referred to the animal in question simply as "rattlesnake," we have deduced that the species was almost certainly the Eastern Massasauga, and not Illinois' only other rattlesnake, the Timber Rattlesnake (*Crotalus horridus*). In Illinois, Timber Rattlesnake habitat consists mainly of forested bluffs, whereas historically, much of Piatt County was known for its "swampy" character (Shonkwiler, 1917). One historical source described the general area as "[thousands of] acres of 'What could it ever be good for' land, home of the deer and prairie wolves and prairie rattlers—a great sea of grass." (Bement Centennial Corporation, 1955).

Shonkwiler (1917) stated that two species of rattlesnake were found in Piatt County. He may have been referring to two color variants of the Eastern Massasauga. Kennicott (1855), for example, referred to these variants as two distinct species, "the black massasauga (*Crotalophorus Kirtlandii*) and the common prairie massasauga (*Crotalophorus tergeminus*)." Timber Rattlesnakes have never been documented in Piatt County, whereas there are multiple records of the Eastern Massasauga there. Today, approximately 91% of Piatt County consists of cropland unsuitable for sustaining Eastern Massasauga populations (Piatt County, n.d.). Despite intensive survey efforts, Eastern Massasaugas have not been documented in Piatt County since 2007, and the species is considered extirpated for management purposes.

The value of this historic envenomation record is significant in that it may imply a historically robust Eastern Massasauga presence in central Illinois. Although detailed information regarding the circumstances of Denman's experience is lacking, we presume, due to his age, that he was bitten close to home. In contrast, most Eastern Massasauga envenomations occur with adults who have encroached

1. West Chicago, Illinois 60185, USA.

2. Illinois Natural History Survey, 1816 South Oak Street, Champaign, Illinois 61820, USA.

into Eastern Massasauga habitat (e.g., Sing et al., 1994). In 1856, Cerro Gordo was a nascent settlement with little to no distinction between homestead and untamed wilderness. The potential for danger awaited any toddler left unattended, even for a short time. Denman's death was reported to have been the first death by any means in the town of Cerro Gordo (Piatt, 1883).

A transcription of Denman's headstone epitaph, today obscured below the ground's surface, was provided courtesy of the Piatt County Historical & Genealogical Society:

"Sleep on sweet child and take thy rest.
God called him home when he thought best."
In memoriam: Eugene Denman

Acknowledgments

We are grateful to Angie Johnson, Martha Harpling, Tom Beauvais, and Dee Lund/Piatt County Historical & Genealogical Society for their research assistance, and Aimee Cavataio, Andrew Kuhns (Illinois Natural History Survey), and Zander Perelman (Illinois Natural History Survey) for their editorial review.

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Bulletin of the Chicago Herpetological Society 59(2):25-26, 2024

Book Review: *Basecamp in the Tropics: My Adventures Discovering Biodiversity in South America* by D. Bruce Means 2023. 271 pp. ECO Publishing, Rodeo, New Mexico. ISBN 978-1-938850-64-6. Softcover $29.95

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Jonesboro, IL 62952
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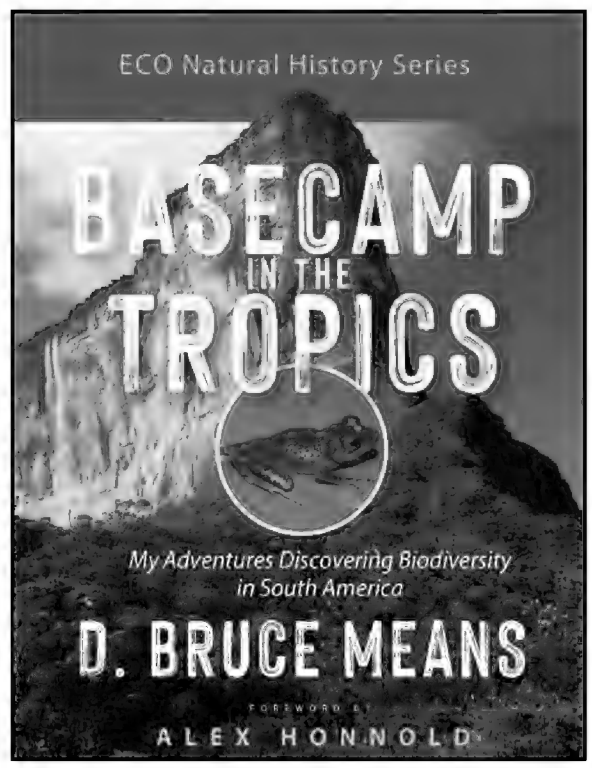
Unexpectedly, I found a package from my friend Dirk Stevenson in my post office box two days before last Christmas. I surmised that it had something to do with a phone conversation we had a few days prior and, upon opening the package, I discovered that I was right. It was a book recently published by Bruce Means entitled, *Basecamp in the Tropics: My Adventures Discovering Biodiversity in South America*. Dirk promised to lend his personal copy of the book to me when he traveled to Illinois in 2024. Instead, he risked mailing the book at the busiest package delivery time of the year.



The author of *Basecamp in the Tropics*, Bruce Means, is a naturalist with a capital "N." Not only is he well-versed in the tepuis of South America, as is apparent in this book, he is a well-respected biologist and educator state-side. He has published extensively on the herpetofauna of the southeastern United States, especially that of the Coastal Plain, as well as on the ecology of the region. I am honored and humbled to have co-authored a couple of journal papers with Bruce, an outgrowth of our mutual love of the endangered longleaf pine ecosystem. Although Bruce is a friend, I made every effort to provide you, the reader, with an unbiased review of his latest book.

Basecamp in the Tropics is a recounting of several field expeditions to the tepuis of South America, from 2003 through 2021. Bruce began visiting tepuis in 1987 but did not initiate scientific research until 2003. All told, he has made 33 excursions to tepuis over a 35-year period.

The book begins, appropriately enough, by describing tepuis. Tepuis are tabletop mountains or mesas in northern South America, with most occurring in Guyana and Venezuela. Because they have sheer cliffs that rise thousands of feet above the surrounding lowlands and are widely separated from each other they have been called "islands in the sky." Due to their relative isolation and their age (tens of millions of years old), tepuis have a high rate of endemism; that is, they are inhabited by species that are unique to tepuis, including species that are unique to individual tepuis. Because so few tepuis have been thoroughly inventoried by biologists, their fauna and flora are still largely unknown. Bruce puts it this way on page 247: "Doing fieldwork in a part of the planet where no previous herpetologist has explored is a naturalist's dream."

The intent of the book is to provide the reader with "a feeling about the trials, tribulations, and especially the joys of doing fieldwork" (page 247). I feel Bruce does an admirable job achieving his goal. By keeping a daily journal on every trip, Bruce basically wrote the book while in the field. The narratives are as fresh as the moment they were written.

The Foreword to the book is written by professional climber Alex Honnold, who accompanied Bruce on his final tepui expedition. In the Preface, Bruce sets the stage for the first three chapters of the book in which he recounts a National Geographic expedition to Mount Roraima, a tepui that straddles the border of Guyana and Venezuela. In chapters 4 through 8, Bruce describes five additional tepui expeditions. Rain is frequent including heavy deluges that render everything and everyone soaking wet for days at a time, sleep is a luxury achieved only in fits and starts, camp food is sometimes unpalatable, equipment fails, and slips and falls are commonplace. Nevertheless, Bruce frequently expresses euphoria as he contemplates his incredible good fortune to be able to explore tepuis.

During these trips, Bruce collects faunal specimens. He takes us along with him every night as he methodically hunts for small, cryptic frogs. Experienced frog chasers among us will relate to Bruce's difficulty pinpointing frogs calling all around him. Oftentimes, however, he makes behavioral observations that help him develop the appropriate search image for his quarry. He captures, photographs, euthanizes, and preserves specimens for scientific scrutiny, describing himself as "the grim reaper." He even licks frogs as a crude assessment of noxious skin secretions.

Occasionally, Bruce mentions that a species under discussion proves to be new to science and refers to the relevant publication in the Literature Cited and Additional Reading section. New species include several frogs, a lizard, a snake, a land crab, and a giant earthworm. Some of the scientific names given to the new species are eponyms honoring Bruce. In other cases, we learn that new species he discusses have yet to be named, which speaks to the meticulous, slow pace of taxonomy. Bruce's most remarkable discoveries include a new snake species that represents an entirely new genus and a new frog species that represents a completely new family and genus. I could not keep track of all the newly discovered species, and I longed for a tabular summary of species new to science that Bruce discovered during his expeditions.

I particularly enjoyed chapters 7 ("Weiassipu Chasm") and 8 ("The Last Tepui") where, despite an aging body, Bruce continues his quest for adventure and knowledge. In Chapter 7, Bruce enlists the help of professional climber Mark Synnott to rappel

almost 200 feet down into a chasm atop Weiassipu Tepui where Bruce searches for a species of pebble toad previously seen by spelunkers. The rope is free hanging, so Bruce dangles mid-air during his descent. At 72 years of age and weighing 260 pounds, Bruce has difficulty negotiating the rope during his descent and is apprehensive about ascending it, the only way out of the chasm. A 9-minute film of this expedition is available at https://www.mountainfilm.org/films/return-to-the-tepuis.

In "The Last Tepui," Bruce describes his last hurrah, trekking to Weiassipu Tepui at age 80. Not as agile as he once was, we cheer Bruce on as he "struggles mightily" with every step through mud, across steep-banked streams, and over rocks and logs. Bruce is physically exhausted at the end of each long trek (up to 11 hours of walking per day) and he frequently soaks in cold-water streams to soothe his aching muscles. Although he has dreams of ascending the sheer cliff of Weiassipu Tepui with professional climbers, he is told it is too dangerous considering his age and physical condition. So, he reluctantly stays behind in camp, making nightly frog-hunting excursions and processing animals he captures, as well as those brought to him by others in camp. Additional new-to-science species are discovered.

In Chapter 9, Bruce reflects on some of his discoveries, discusses additional studies and inventories of tepuis that could be considered, and ends with a plea for their protection. This chapter is followed by a list of citations, acknowledgments, and a brief biography of Bruce. Those wishing to learn more about the author, including other books that he has penned, are encouraged to visit his website: www.brucemeans.com.

The 6½- × 9-inch book is only available in paperback. Nonetheless, it feels sturdy and well bound. A color photograph of a tepui rising from the forest below graces the front cover, in front of which is small photograph of a Mimic Rainfrog, *Pristimantis dendrobatoides*, a tepui species discovered and named by Bruce. Additional color photographs are sprinkled throughout the book. They include spectacular photographs of tepuis and tepui waterfalls, as well as excellent images of vegetation, frogs, snakes, lizards, a caiman, invertebrates, and people. I particularly liked a two-page photograph of a bright yellow helicopter hovering over a massive waterfall plunge pool, the only opening in the forest canopy.

A small map of the tepui-rich junction of Brazil, Guyana, and Venezuela is provided on page 261. I am disappointed, however, because the map does not include several tepuis or villages that Bruce mentions. Bruce does explain that many tepuis are unmapped, but couldn't the publisher have created a novel map for the book?

Publishing errors are rare and include: 1) displaced text at the bottom of page 9, 2) a second use of "28 July 2003" that should have read "29 July 2003" on page 113, 3) an unfinished sentence at the bottom of page 123, 4) "M." instead of "Mt." on page 130, 5) misspelling of "several" on page 203, and 6) the use of "the" twice in succession on page 250. Because the text is taken directly from Bruce's field journal, there is inconsistent use of metric and English units of measurement. I do this, too, in my field notes, using metric sometimes, English other times. Normally, I would be annoyed by such inconsistent use of units of measurement in a publication, but in this case their interchanging use lends the book a sense of authenticity, of being in the moment.

If you have ever dreamt of discovering new species in some faraway tropical setting, this book is for you. Written in the style of a chronological diary, the reader feels as though they are following Bruce's every step and peering over his shoulder as he captures, photographs, and processes his specimens. I found it to be a pleasant read and a real page-turner. I highly recommend it.

Acknowledgments

I thank Dirk Stevenson for loaning me his copy of *Basecamp in the Tropics*, and Mike Dloogatch for the opportunity to share this review in the *Bulletin* and for his editorial prowess.

Bulletin of the Chicago Herpetological Society 59(2):27-28, 2024

Herpetological Art at the Henson Robinson Zoo, Springfield, Illinois — April 21, 2023

Photos and story by
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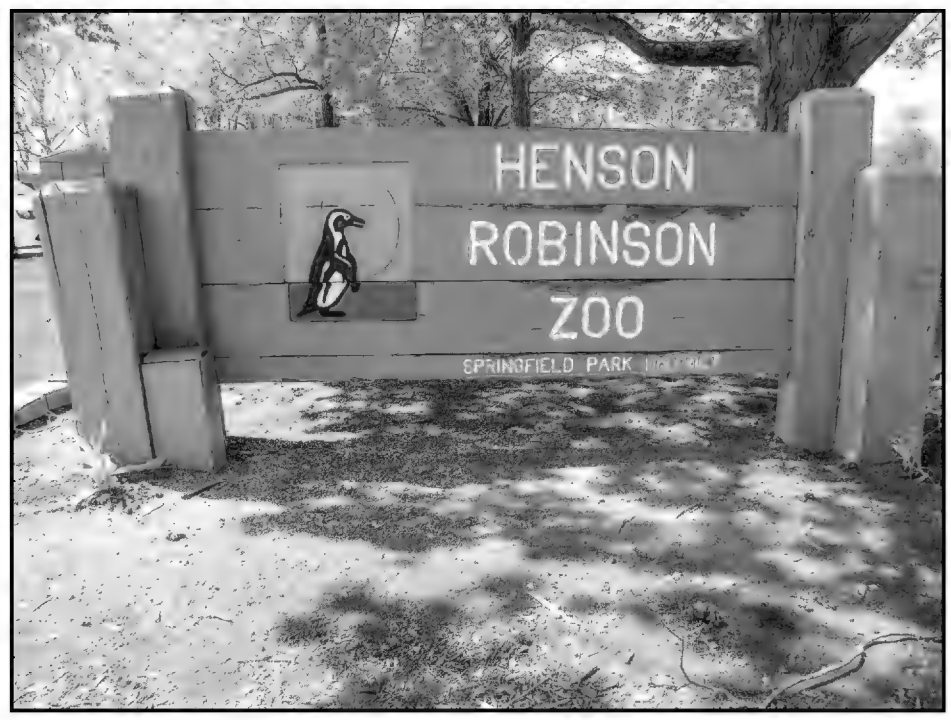
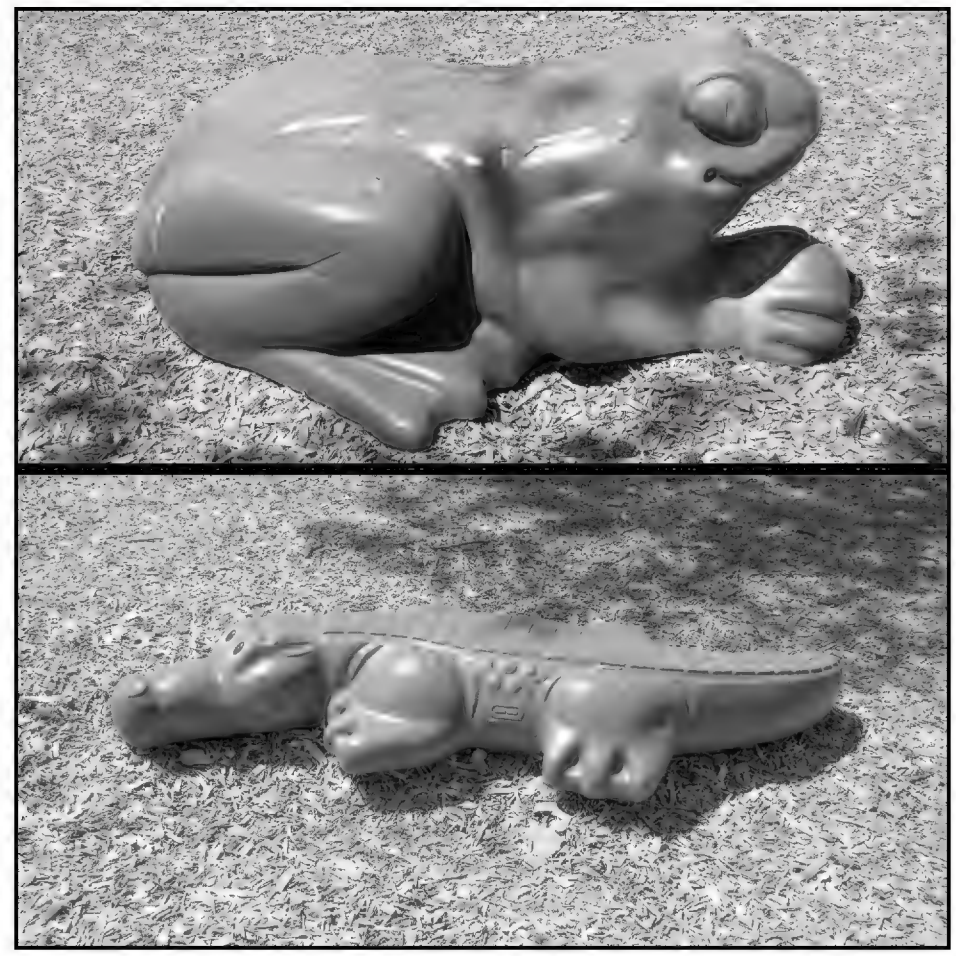
While on my way to visit the in-laws near St. Louis, Missouri, I made a side trip to Springfield, Illinois, to see an old friend, Doug Hotle, who is the director of the Henson Robinson Zoo in Springfield. We had a nice visit and spent a couple of hours walking around the zoo.



The building that has the main entrance also has the gift shop, some offices, an education room, rest rooms, a large cage that holds an Argentine black-and-white tegu (*Salvator merianae*), and a mosaic made from colored bottle caps that has images of two frogs. This display is mounted above an aquarium that has two species of poison dart frogs, black-legged poison dart frogs (*Phyllobates bicolor*) and golden poison dart frogs (*Phyllobates terribilis*). The left-hand side of the mosaic includes a blue frog with four black images above the frog; these images look like they are meant to be ants. In front of the blue frog are two images that are mostly white and look like they might be mushrooms. The right-hand side of the mosaic shows a yellow frog sitting on a green leaf. Above the frog is a brown image of what I think is meant to be a ladybug, plus a black image that looks like a large ant. I can't tell what everything else is meant to be.

There is a playground area for children with platforms for children to climb on with slides and a few fiberglass statues for children to climb on. The platform is mostly a light tan color with dark brown posts and two panels that each have the image of a lizard approximately four to five feet long and looks like it might be some kind of gecko plus an image of a snake that is approximately five feet long. One of the statues is a frog that is approximately three feet long and another is an alligator that is approximately four feet long. Both of these statues are cartoon like in appearance and are colored green.



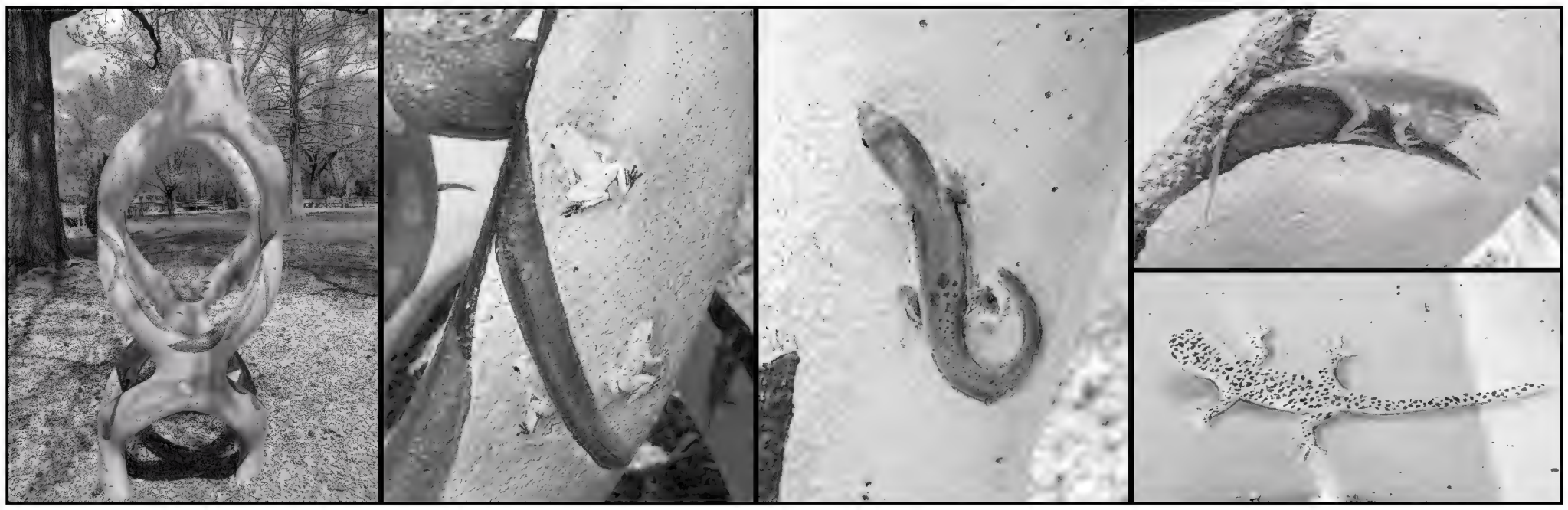
In a corner near two buildings there is a fiberglass statue of a squat frog that is approximately three feet long and is a weathered gray color.

Near the center of the zoo where three sidewalks come together there is a white painted image of what is probably some kind of box turtle and this is maybe three feet long. This looks like it's been there a long time because the image is faded from weathering and people walking across it.

Several concrete statues are scattered around the zoo, including a turtle, a hippopotamus, a dolphin and a structure that I guess is meant for children to climb on. Doug told me that these statues used to be the usual gray concrete color, but someone asked if they could paint these statues and the zoo gave them

permission to paint them. The turtle statue is approximately six feet long, three feet wide and two feet tall to the top of the shell. There are a variety of painted geometric shapes in colors from red, pink, green, blue, yellow, white and black. The climbing structure is approximately six feet tall and two and a half feet in diameter with the lower part of the climbing structure mostly light yellow and the upper part a darker shade of yellow. There are three snakes painted here. One of the snakes is an orange color, another is a light blue and the other one is purple. The platform also holds several painted images of what I think might be the black-legged poison dart frogs because these images have black feet, several painted images of what look like green anoles, *Anolis carolinensis*, one of which has an extended dewlap, one painted image of a day gecko, *Phelsuma grandis*, and one painted image of a leopard gecko, *Eublepharis macularius*.

The Henson Robinson Zoo is a relatively small zoo but covers 15 acres with over 200 animals in very nice displays plus they are building new displays. Check out their web site https://www.hensonrobinsonzooed.org.



Herpetology 2024

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

HYPERPREDATION BY SUBSIDIZED CORVIDS

P. D. Moldowan [2023, Herpetological Monographs 37:70-94] notes that subsidized predators are animals whose populations proliferate through association with humans. As subsidized predators, birds in the family Corvidae (*Corvus* spp., crows and ravens) pose an additive mortality threat to turtle eggs, juveniles, and, in some cases, adults. The author (1) reviews published and unpublished case studies of corvids as predators of chelonians, (2) examines regional population trends of corvids relative to the status of co-occurring chelonian species, and (3) evaluates our current understanding of subsidized corvids as threats to chelonians. Hyperpredation of chelonians by corvids is geographically widespread, locally severe where and when predation occurs, facilitated by anthropogenic subsidies (e.g., food, water, and perching, nesting, and roosting sites) and linear corridors (e.g., roads, electrical infrastructure), commonly associated with nesting corvids as predators, and co-occurring with corvid population increases. Hyperpredation by corvids appears to affect demographically sensitive stages of chelonian populations (juveniles and reproductive females), and very likely has long-term detrimental consequences. The threat posed to chelonian populations by subsidized corvids is more widespread than currently recognized on the basis of substantial regional increases in corvid populations, the under-reporting of predation observations, and the broad geographic areas over which hyperpredation of chelonians is occurring.

BACKGROUND MATCHING BY HORNED LIZARDS

D. D. Rhoads and D. A. Williams [2023, Journal of Herpetology 57(1):27-35] note that most of the literature on the basic ecology of Texas horned lizards (*Phrynosoma cornutum*) cites "cryptic color pattern" as their first line of defense against predation, and yet the degree to which Texas horned lizards' coloring matches their backgrounds has never been quantified. Several zoos and state wildlife agencies are releasing captive-bred and translocated lizards to parts of their former range. Background color matching may be important to consider when moving lizards into a new habitat where predation may be higher if they are not closely color matched to the local soils. The authors asked whether lizards more closely match their local soil colors and sun-bleached plant stems than soils and stems from other areas. They found that lizards more closely match their local soil colors than they do the soil colors of other areas and that their vertebral white stripe matches sun-bleached plant stems more than other objects in their environment. They also present background color-matching variation for this taxon in Texas, New Mexico, and Mexico from in situ photos taken, as found, in the wild. They suggest that zoos and wildlife agencies score coloration in their captive populations of lizards, thus possibly enabling these institutions to objectively consider color matching a priori as an applied conservation strategy to potentially increase the survival of reintroduced Texas horned lizards.

SHELL SHAPE IN PAINTED TURTLES

E. Maki et al. [2023, Herpetologica 79(3):144-150] note that an organism's body shape is influenced by its ecology and environment through selective pressure and phenotypic plasticity. The shape of turtle shells is impacted by locomotor efficiency, and shell shape has been shown to differ between populations occupying different water flow regimes. However, it is not known whether other aspects of the environment, such as water turbidity or plant density, similarly impact shape by influencing locomotor efficiency. The authors used geometric morphometric methods to analyze the shell shapes of painted turtles (*Chrysemys picta*) from several Wisconsin populations. Water turbidity was found to be correlated with different shell shapes among populations. In more turbid water, turtle shells were narrower than shells in clear water, and there was an interactive effect between water turbidity and plant density such that shells were anteriorly taller in high plant densities with high water turbidity than in low water turbidity. Shell shape also differed between the sexes and varied with adult size. These correlations suggest that aspects of the aquatic environment in addition to water flow may impact turtle shell shape by influencing locomotor efficiency and that this variation is detectable even within a species and region.

EFFECTS OF GOPHER TORTOISE EXCLUSION

R. B. Lloyd, Jr., et al. [2023, Journal of Herpetology 57(4): 367-372] note that herbivory serves as a critical top-down mechanism within plant communities by regulating biodiversity, productivity, and ecosystem function. Although top-down impacts of mammalian herbivores have garnered significant attention in the literature, fewer studies have investigated the role of herbivorous reptiles, which can serve as crucial herbivores for some ecosystems, in regulating plant communities. In southeastern coastal plain longleaf pine forests of the United States, gopher tortoises (*Gopherus polyphemus*) are a keystone species that may suppress plant productivity and promote local diversity within hyperdiverse understory plant communities. In January 2019, the authors established permanent tortoise exclusion plots with corresponding accessible control plots within an active gopher tortoise population at Splinter Hill Bog Preserve in southwestern Alabama. They measured the response of plant species diversity, composition, and productivity through a single growing season to quantify short-term impacts of tortoise exclusion on understory plant communities. They found that tortoise exclusion plots had 35% more plant cover, with a 15% reduction in plant richness, 6% reduction in evenness, and 12% reduction in Shannon's diversity, relative to control plots. Within a single growing season, tortoise exclusion explained 5% of the variation within overall plant community composition. The results provide clear evidence on the role of gopher tortoise herbivory for the maintenance of plant diversity within species-rich longleaf pine forests of the southeastern United States, even across a single growing season.

EFFECTS OF HEAT AND LIGHT SOURCES

D. Kane et al. [2023, The Herpetological Bulletin 166:1-9] note that reptiles are sensitive to electromagnetic radiation at wavelengths between the ultraviolet and infrared bands. Husbandry practitioners designing artificial lighting arrays should aim to provide spectra that approximate those to which a given species has become adapted in nature. This would satisfy biological needs ranging from thermoregulation and vitamin D_3 photobiosynthesis to vision and communication. The authors evaluated the spectral outputs of two artificial lighting arrays (A and B) in their ability to provide this. Array A was designed to replicate those used as standard over the last decade in many controlled environments, while the Array B was intended to provide a more solar-like output. They also measured behavior and calculated a modified Spread of Participation Index (mSPI) for three species of reptile (turtle, lizard and snake) as the arrays were alternated in an A-B-A design (in observation periods 1, 2 and 3). Data were analyzed using randomization to deal with small sample size and repeated measures. Although in theory Array B provided a better spectrum than Array A, there were no clear patterns where behavior and mSPI shifted going from Array A to B then reverted when going from Array B to A. However, the lizard and turtle both showed unexplained behavioral shifts, and the lizard an associated mSPI shift, when going from Array B to A. The results demonstrate the power of combination lighting arrays to better approximate solar spectra, but also that behavioral observations may not reflect theoretical implications. The authors suggest reasons for this and directions for future research.

CROCODILES IN THE DOMINICAN REPUBLIC

R. M. Greco, Jr., et al. [2023, Journal of Herpetology 57(4): 418-427] note that crocodilian populations declined globally during the 20th century because of overhunting and habitat loss. Some crocodilian populations recovered over the past 50 yr through legal protections and habitat restoration, but the statuses of many populations are poorly known. The status of the American crocodile (*Crocodylus acutus*) population in the Dominican Republic (DR) is currently unknown because the last country-wide surveys were done in the 1980s. The authors carried out population surveys in DR during May–July 2021 in areas where *C. acutus* has been observed historically to provide an updated population status. The surveys yielded no crocodile sightings in northwestern DR, suggesting that crocodiles have been extirpated or nearly extirpated from this area. Surveys of Lago Enriquillo in southwestern DR produced 120 crocodile sightings over 72.6 km of shoreline, for an overall encounter rate of 1.65 crocodiles/km and nonhatchling encounter rate of 1.40 crocodiles/km. Encounter rates were very high in the main nursery area of the lake (La Azufrada; 60.0 crocodiles/km) and much lower elsewhere. Our *C. acutus* sightings were composed of 18 (15%) hatchlings, 45 (37.5%) juveniles, 12 (10%) subadults, and 32 (26.7%) adults, and the authors were unable to estimate size for 13 (10.8%) individuals. During 2021 nest surveys, they only located 42 nests in Lago Enriquillo. The data suggest the DR population of *C. acutus* is critically endangered and is continuing to decline because of pressure from hunting, fishing, and habitat destruction caused by both anthropogenic factors and natural lake level fluctuations.

DIPNET SURVEYS

D. G. Cook et al. [2023, Herpetologica 79(2):73-78] note that several aquatic sampling techniques are commonly used to detect and quantify amphibian larvae. Although many techniques have been standardized, comparisons among methods have been poorly studied. They employed a removal design to investigate the detection rate of amphibian larvae using box enclosures and evaluated the reliability of timed dipnet sampling relative to the more quantitative box enclosure sampling across 13 vernal pools. For these comparisons, they studied larvae of the endangered California tiger salamander (*Ambystoma californiense*; CTS) and the smaller and more abundant tadpoles of the Pacific treefrog (*Pseudacris regilla*; PTF). Based on N-mixture model estimates, box enclosure sampling captured only 5% more of the CTS larvae present than PTF tadpoles, despite disparities in their sizes and estimated abundances. Dipnet sampling was slightly more effective at detecting CTS larvae than was enclosure sampling, while both methods equally detected PTF tadpoles. They found a strong relationship (R^2 = 0.92) between the densities of CTS larvae estimated from dipnet sampling and those calculated from the more quantitative enclosure sampling, indicating that dipnet sampling is a reliable measurement of relative abundance. They conclude that timed dipnet surveys can be an important tool for monitoring populations of CTS, and possibly other lentic-breeding amphibians, especially given its relative efficiency that can be replicated across both time and space.

TIGER SALAMANDER BREEDING PONDS

H. G. Small and E. B. Liebgold [2023, Journal of Herpetology 57(1):42-51] note that habitat loss, degradation, and modification are important drivers of global population declines in amphibians. Most amphibians have a biphasic lifestyle and are susceptible to threats in both aquatic and terrestrial habitats. Eastern tiger salamanders (*Ambystoma tigrinum tigrinum*) are endangered throughout much of their range in the eastern United States, including Maryland and Delaware. *Ambystoma t. tigrinum* breed in ephemeral freshwater ponds and then migrate into the surrounding terrestrial environment after metamorphosis. Limited research exists about what habitat characteristics play a role in breeding pond use. We sought to understand what features of the breeding pond and surrounding landscape influence abundance and occupancy. The authors measured salamander occupancy, salamander abundance, and water quality parameters at ponds during the 2018 and 2019 breeding seasons. They used geographic information systems to determine pond area and the percentage of forest area and road density surrounding a pond at four spatial scales. Pond occupancy by *A. t. tigrinum* was positively associated with increased depth and less forest cover at the largest spatial scales. Abundance of *A. t. tigrinum* was greatest in larger, deeper ponds, potentially because these factors increase hydroperiod. More basic pH and decreased conductivity were also associated with higher male salamander abundances in ponds. Forest area and road density were not in the top-ranked model, although ponds in this study had a minimum of 70% forest area within 150 m. These findings elucidate relationships between *A. t. tigrinum* and their habitat, providing knowledge for future management of this state-endangered species.

THREE INVASIVE FROGS IN FLORIDA

A. J. Mularo et al. [2023, Journal of Herpetology 57(4):381-389] note that invasive species pose serious ecological and economic threats to native biological systems. The temporal dynamics of invasions are often difficult to characterize but can provide key insights into patterns of establishment and spread of introduced species. The authors reconstructed the timeline of historic occurrence for all three invasive anurans in Florida, greenhouse frogs (*Eleutherodactylus planirostris*), cane toads (*Rhinella marina*), and Cuban treefrogs (*Osteopilus septentrionalis*). They analyzed publicly available data sets using geostatistical spatial interpolation to assess the expansion of these species within Florida since their introduction. Their analysis indicates that all three species underwent a patchy dispersal involving multiple translocation events. Greenhouse frogs have occupied Florida since 1930 but started increasing their occupancy in the 1970s. In contrast, both cane toads and Cuban treefrogs were introduced to the mainland by the 1960s and were restricted to small geographic regions of Florida until about 1990 when both species increased their rate of spread. Currently, the expansion rates of greenhouse frogs and cane toads show signs of decreasing while the invasive range of Cuban treefrogs continues to grow at an exponential rate. The authors' results reveal that after a relatively long integration phase, there was a sharp increase in the area occupied by all three species. The timing and duration of the exponential phase, however, differed among species. The authors compare invasion histories across species to discuss potential drivers that may have influenced these anuran invasions. This study shows that historic records, despite their limitations, can help reconstruct the range expansion process of invasive species.

SOLAR FARMS AND BOX TURTLES

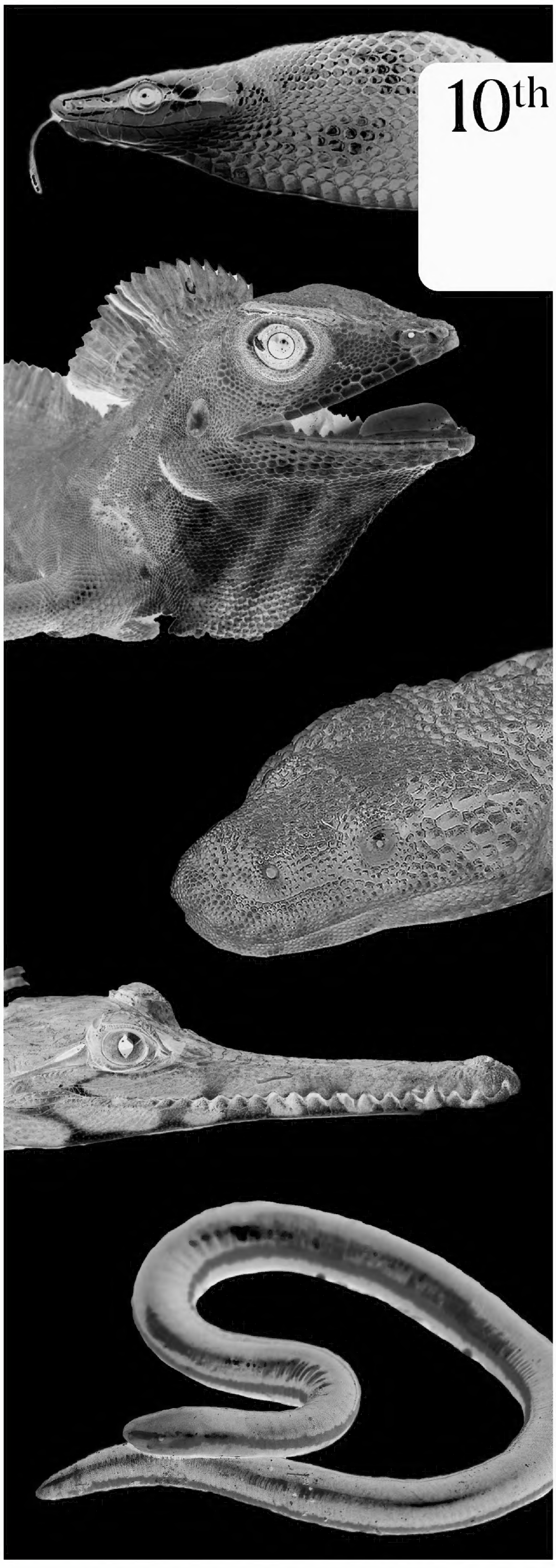
R. P. Dougherty et al. [2023, Journal of Herpetology 57(1):11-19] note that eastern box turtle (*Terrapene carolina*) populations have declined drastically since 1970 because of continued destruction and fragmentation of their habitat. Although they are known to shift their home ranges because of environmental degradation, it is unknown how solar arrays impact eastern box turtles. From 2011 through 2018, the authors collected data on eastern box turtle movement and occupancy in a 79-ha solar farm. The solar farm is divided into six fenced areas, each containing wildlife openings for movement of terrestrial fauna every 23 m around the fenced solar arrays. It was hypothesized that the solar arrays changed the home range sizes of turtles that interacted with the field. They fitted 41 eastern box turtles with radio transmitters and tracked their locations twice per week in June–August from 2011 to 2018. Seventeen turtles had home ranges that overlapped with the solar arrays whereas 24 turtles had home ranges that never interacted with the solar arrays. They calculated home range sizes and tested for differences between overlapping and nonoverlapping groups. They further considered if the number of observations within the solar farm impacted home range size and displacement. Eastern box turtles that used the solar farm exhibited 55–83% larger home ranges on average than turtles in natural habitats, but there was no significant association of home range size with the amount of time observed within the solar farm. Finally, the authors discuss strategies to mitigate negative impacts of solar farm development on turtles.

JUVENILE LIZARDS MAY GET THERE FIRST

J. M. Wiggins et al. [2023, Herpetologica 79(2):91-97] note that in many species, males are larger and more colorful than females. This has often evolved by sexual selection, and the sexual dimorphism and dichromatism is observed once individuals reach adulthood. Such sexual differences are presented by collared lizards, *Crotaphytus collaris*. However, sexual dichromatism of a different sort than that expressed in adults is seen in juveniles before their first brumation. Late-season juvenile males develop bright orange dorsolateral bars and begin to defend territories and form pair bonds with females. Furthermore, the largest, late-season, putative juvenile males have mature sperm on their hemipenes. Paternity analyses using polymerase chain reaction of eight microsatellite loci revealed that a significant number of putative juvenile males, which were not seen during intensive fieldwork at the authors' study site the following year, sired offspring with females who were juveniles, yearlings, or adults in the fall. Either females were fertilized by these males in the fall (and those females either stored sperm or arrested development of embryos overwinter), or they were fertilized by surviving fall juvenile males (i.e., yearlings) early the next spring, who subsequently died before the authors began their spring-summer field surveys. The majority of the data indicates the second possibility is true. First, adults and yearlings of both sexes begin brumation in the fall, weeks or months before October when larger putative juvenile males display sexual dichromatism and have mature sperm on their hemipenes. Females of these age classes are not available for copulation in October but are in early spring. Second, the authors collected juvenile females from the field in October and held them individually without exposure to males in the laboratory through brumation and beyond through spring and summer. None of these females became gravid. These results indicate that although putative juvenile males possess mature sperm in the late fall, they wait until the following spring to fertilize adults of all age classes. Many of these males subsequently die early in the season but attain (posthumous) fitness by mating early in the spring before yearling and adult males become fully territorial and sexually active.

MADEIRA LIZARD POPULATION DENSITY

K. Arbuckle and A. J. N. Arbuckle [2023, The Herpetological Bulletin 163:24-27] note that the Madeira lizard, *Teira dugesii*, is a lacertid species endemic to the Madeiran and Selvagens Archipelagos, and is the only native terrestrial vertebrate on those islands. On Madeira, the species is typically very bold, allowing people to approach closely, and is found throughout the island from sea level to the tops of the highest peaks. The authors report that this species may attain the highest biomass density known for any terrestrial vertebrate. Based on surveys of the garden walls of the Quinta Jardins do Lago Hotel, they estimated a density of 38.34 kg per hectare, more than double the highest biomass density previously recorded for any terrestrial vertebrate.



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UPCOMING MEETINGS

Monthly meetings of the Chicago Herpetological Society begin at 2:00 P.M. on the third Sunday of each month. Please try to join us online or *in person* at the Notebaert Nature Museum, 2430 N. Cannon Drive, Chicago. The next meeting will take place on Sunday, February 18. The program will be given by **Lily Barajas**, manager of living collections at the Peggy Notebaert Nature Museum. Lily will speak about "Blanding's Turtles, Mysteries of the Marsh and More at the PNNM."

The March 17 meeting will be an in-person live animal presentation by **Ali Baghdadi** of Ali's Reptile Den.

Please check the CHS website or Facebook page each month for information on the program. Information about attending a Zoom webinar can be found here:
<https://support.zoom.us/hc/en-us/articles/115004954946-Joining-and-participating-in-a-webinar-attendee->

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? The next board meeting will be held online. If you wish to take part, please email: rcrowley@chicagoherp.org.

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